Preventing intrahospital transmission of COVID-19: Experience from the University Hospital Zurich in Switzerland

Rampini, S K ; Wolfensberger, A ; Sax, H ; Thienemann, F

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To the Editor: The COVID-19 pandemic that started in China in December 2019 has been declared a public health emergency of international concern by the World Health Organization.[1,2] COVID-19 is caused by SARS-CoV-2, a highly contagious RNA virus from the family *Coronaviridae*,[3] requiring effective infection control measures to prevent transmission and spread of disease. Many hospitals and other healthcare facilities around the world have experienced COVID-19 outbreaks among staff and patients.[4,5] Protection of frontline healthcare workers (HCWs) and patients against acquisition of COVID-19 is therefore crucial. Adherence to standard and transmission-based precautions is essential to prevent SARS-CoV-2 transmission in hospitals.

Standard precautions assume that every person is potentially infected or colonised with a pathogen that could be transmitted in the healthcare setting.[6] To protect against COVID-19, the University Hospital Zurich (USZ) implemented *enhanced standard precautions* on the entire hospital campus to raise the general safety level for both patients and HCWs (Table 1 and Fig. 1). Transmission-based precautions for patients with confirmed COVID-19 and patients under investigation for COVID-19 following national guidelines[7] were implemented (Table 1). Repetitive and extensive training applying a 'train-the-trainer' approach, supported by educational videos on the intranet and provision of easy-to-read standard operating procedures and on-site posters, enabled implementation to take place. In addition, the staff health unit at USZ established a hotline service for all employees with respiratory symptoms to arrange counselling and screening for COVID-19 using nasopharyngeal swabs and polymerase chain reaction (PCR) for SARS-CoV-2 testing. In case of positive SARS-CoV-2 PCR, contact investigation was initiated in the hospital by our staff health unit together with the infection control services, and in the community by the local health authorities.

From 1 March 2020 to 15 May 2020, >250 patients tested positive for COVID-19 at our institution. During the same period, nearly 10% of the ~8 500 USZ employees underwent SARS-CoV-2 screening using nasopharyngeal swabs and PCR because they had symptoms compatible with COVID-19. Of these, ~5% tested positive for COVID-19 and were sent home for self-isolation. Contact tracing was initiated in all cases. About one-third of positive employees were exposed to a person with COVID-19 in the household or community setting. In another third of positive employees, transmission probably occurred in our institution from workmates with confirmed COVID-19. The majority of these transmissions were between non-HCWs, i.e. employees in administrative and operative positions. In the remaining third, direct exposure to COVID-19 could not be established. All the transmissions among hospital employees occurred before national lockdown (13 March 2020) and implementation of our enhanced

Fig. 1. Medical staff on the COVID-19 isolation ward at University Hospital Zurich (courtesy of Friedrich Thienemann).

Table 1. Enhanced standard precautions on campus at the University Hospital Zurich and transmission-based precautions according to the principles of PPE in confirmed COVID-19 patients and in patients under investigation for COVID-19

Enhanced standard precautions	Transmission-based precautions (applied in patients with confirmed COVID-19 and in patients under investigation)
• Strict hand hygiene according to established indications • Mandatory surgical masks at all times on campus for hospital employees • Goggles if direct patient contact <2 m • Respirators during aerosol-generating procedures • Patients wear surgical masks and perform hand hygiene when leaving bed place • Social distancing >2 m • Avoid meetings with >5 people, staff and academic meetings to take place via online video conferencing, and clinical boards via online video conferencing or seating with social distancing • Home office if feasible • Entire hospital campus closed for visitors • Access only with staff card at security check • Hand sanitisers at all entry points • Max. 2 people at one table in cafeteria	• Use of surgical masks, goggles, protective medical gowns, and gloves with extended cuffs (Fig. 1) • No scrub cap, no boot cover • Correct donning and doffing, correct behaviour during patient care • Designated areas for PPE donning and doffing • Use of respirators instead of surgical mask during aerosol-generating procedures • Use of respirators instead of surgical mask in prolonged face-to-face contact with coughing patients not wearing surgical masks

PPE = personal protective equipment.

standard precautions (20 March 2020). To date, all infected staff members have recovered from COVID-19 and returned to their workplace. Only one HCW required hospital admission during the course of the disease.

At the beginning of the epidemic, some intrahospital contact tracings had to be carried out as patients tested positive for SARS-CoV-2 only during the course of their hospital stay. Some of these patients were hospitalised for several days before being diagnosed with COVID-19, and some underwent aerosol-generating procedures. Several dozens of HCWs were considered to have been exposed to these index patients, as they did not wear adequate personal protective equipment (PPE), e.g. used a surgical mask instead of a respirator. These HCWs were all placed in quarantine at home and were followed up for signs of COVID-19 for 10 days. Fortunately, none of the exposed HCWs acquired COVID-19. Even though we continue to diagnose patients with COVID-19 occasionally during the course of their hospital stay (e.g. during screening of asymptomatic patients), the risk of intrahospital transmission of COVID-19 is considered very low due to the enhanced standard precautions, including permanent wearing of surgical mask and goggles.

The above findings demonstrate the importance of thorough implementation of general hospital-wide precautions – enhanced standard precautions at the USZ – together with transmission-based precautions for patients with confirmed COVID-19 and patients under investigation for COVID-19. Patients, HCWs and other hospital staff can 'import' SARS-CoV-2 from the community into the hospital. Intrahospital transmissions of COVID-19 from and to patients and HCWs can be halted if clear PPE guidance is offered and adherence to enhanced standard precautions and transmission-based precautions is high. Information on signs and symptoms of COVID-19, low-threshold SARS-CoV-2 testing and consequent contact tracing is warranted to identify COVID-19 cases in staff members early and to prevent intrahospital transmission and outbreaks. Simple, targeted and repetitive communication strategies to staff are of utmost importance in order to achieve universal compliance.

Silvana K Rampini
Department of Internal Medicine, University Hospital Zurich, University of Zurich, Switzerland

Aline Wolfensberger, Hugo Sax
Department of Infectious Diseases and Hospital Epidemiology, University Hospital Zurich, University of Zurich, Switzerland

Friedrich Thienemann
Department of Internal Medicine, University Hospital Zurich, University of Zurich, Switzerland; Department of Medicine, Faculty of Health Sciences, University of Cape Town, South Africa; and General Medicine and Global Health, Cape Heart Institute, Faculty of Health Sciences, University of Cape Town, South Africa
friedrich.thienemann@uct.ac.za

1. World Health Organization. Novel coronavirus (2019-nCoV) situation report 11. 31 January 2020. https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200131-sitrep-11-ncov.pdf?sfvrsn=de7c0f7_4 (accessed 14 May 2020).
2. Zhu N, Zhang D, Wang W, et al. A novel coronavirus from patients with pneumonia in China, 2019. N Engl J Med 2020;382(8):727-733. https://doi.org/10.1056/NEJMoa2001017
3. Wu F, Zhao S, Yu B, et al. A new coronavirus associated with human respiratory disease in China. Nature 2020;579(7798):265-269. https://doi.org/10.1038/s41586-020-2008-3
4. Minder R, Peltier E. Virus knocks thousands of health workers out of action in Europe. New York Times, 24 March 2020. https://www.nytimes.com/2020/03/24/world/europe/coronavirus-europe-covid-19.html (accessed 14 May 2020).
5. Westcott B, Renton A, Picheta R, Alfonso F. Wave of infections hits German cancer ward. CNN, 17 April 2020. https://edition.cnn.com/asia/live-news/coronavirus-pandemic-intl-04-15-20/h_9543b78d7faf6997eb3bba818cb6d940 (accessed 14 May 2020).
6. Centers for Disease Control and Prevention. Interim infection prevention and control recommendations for patients with suspected or confirmed coronavirus disease 2019 (COVID-19) in healthcare settings. Update 18 May 2020. https://www.cdc.gov/coronavirus/2019-ncov/hcp/infection-control-recommendations.html#adhere (accessed 14 May 2020).
7. Swissnoso. Interims Vorsorgemassnahmen in Spitälern für einen hospitalisierten Patienten mit begründetem Verdacht oder mit einer bestätigten COVID-19 Infektion. 2020. https://www.fmh.ch/files/pdf23/empfehlung-swissnoso-02.04.2020.pdf (accessed 14 May 2020).

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